ENVIRONMENTAL ASSESSMENT

SCIENTIFIC COLLECTION PERMIT FOR CORMORANTS ON LEECH LAKE MINNESOTA

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United States Department of Interior
Fish and Wildlife Service

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CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Pursuant to the National Environmental Policy Act (NEPA), the U.S. Fish and Wildlife Service (hereafter, USFWS) has prepared this Environmental Assessment (EA) to consider the potential impacts to the human environment that may result from the take of Double-crested Cormorants, *Phalacrocorax auritus*, (hereafter, "cormorants") at Leech Lake, Minnesota. The Leech Lake Band of Ojibwe (hereafter, Band) is proposing the collection of cormorants from the tribally owned Gull and Little Pelican Islands as part of scientific research projects evaluating fish-cormorant population dynamics and the impact of recently detected zebra mussels on ecosystem dynamics in the lake. We considered two alternatives for issuing scientific collection permits (SCP) in accordance with 50 C.F.R. § 21.23 of the governing regulations under the Migratory Bird Treaty Act, as amended (MBTA) (16 USC 703–712).

This EA assists our compliance with the NEPA and helps us make an informed management decision. It also aids us in making a determination as to whether the actions could "significantly" impact the human environment, which includes, "the natural and physical environment and the relationship of people with that environment" (40 C.F.R. § 1508.14). "Significantly" under NEPA is defined by regulation 40 C.F.R. § 1508.27, and requires short-term and long-term consideration of both the context of a proposal and its intensity, and whether the impacts are beneficial or adverse. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI) (40 C.F.R. § 1508.9 (a) (1)). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then a SCP will not be issued for the project. If it is found not to have "significant" impact, a FONSI will be signed for the EA approving the alternative selected.

1.1 PURPOSE AND NEED FOR ACTION

The USFWS must respond to an application from the Band for a Scientific Collection Permit (50 C.F.R. § 21.23) to take cormorants for their studies, while meeting USFWS responsibilities to conserve migratory birds per Executive Order 13186. Previously, the Band acquired cormorant carcasses for their research from other valid SCPs as well as from cormorant damage management activities authorized under the recently vacated Public Resource Depredation Order (hereafter, PRDO). To continue the research this year, the Band has

applied for another scientific collection permit.

The USFWS needs to:

(1) respect the sovereignty of the Band with a timely response;
(2) protect co-nesting birds, and other non-target species from actions taken to acquire cormorants;
(3) and ensure the long-term conservation of Leech Lake, state and regional cormorant populations, while improving long-term management options

1.2 BACKGROUND

Cormorants are fish eating birds that nest in large colonies, often with other colonial-nesting bird species (Dorr et al. 2014). Cormorants generally prefer slow-moving schooling fish in the 1-4 inch range, but commonly take fish < 6 inches (Dorr et al. 2014). Individual cormorants consume an average of approximately 1.2 pounds of fish per day during the breeding season and 1 pound per day during the non-breeding season with estimates ranging from 0.5 – 1.4 pounds per bird per day (Dorr et al. 2014; Ridgeway 2010). Concerns have been expressed regarding the impact of large concentrations of cormorants on free-swimming fish populations, especially sport fish (Fielder 2008, Diana 2008, Dalton et al. 2009, Fielder 2010, Dorr et al. 2012, Ridgeway et al. 2012, Schultz et al. 2013, Shwiff et al. 2015).

The cormorant colony on Leech Lake nests primarily on Gull and Little Pelican Island, tribally-owned islands in Leech Lake. The number of cormorants at this colony increased dramatically in the late 1990s and peaked in 2004 with a fall population of around 10,000 birds. Sport anglers and the tourism community expressed concern that the colony was having an adverse effect on the game and forage fish populations.

The Leech Lake Band Division of Resources Management (hereafter, DRM) in partnership with the USFWS, Minnesota Department of Natural Resources (hereafter, MNDNR) and University of Minnesota, initiated a diet and fisheries study in 2005 to address these concerns.

Diet samples were collected from cormorants and nestling chicks, fish were measured and identified, and fish consumption by cormorants was estimated using a bioenergetics model developed primarily by MNDNR for this purpose. Fish population data from Leech Lake was collected annually by the MNDNR to track fish population trends. Following examination of the model results and fish population data, it seemed that there may have been a link between

high cormorant numbers and low recruitment of young walleye to catchable sizes. This negative effect appeared to be due to the consumption of age I and age II fish as opposed to young-of-the-year walleye. Under normal conditions it is assumed that this age class of fish typically survives compensatory mortality, but cormorant consumption appears to be additive for these age classes. A second cormorant diet and telemetry study was also funded by a USFWS Tribal Wildlife Grant in 2008. The purpose of the second study was to gather more diet information and obtain data on cormorant movements and use of Leech Lake (Hundt et al. 2013, Schultz et al. 2013, Band 2016).

Results of the first two diet studies (Hundt et al. 2013, Schultz et al. 2013) were confounded by impacts of other management activities that were initiated concurrently with cormorant population reduction that was taking place on the lake. Walleye fry stocking during 2005-2014, including legislatively mandated stocking, added high numbers of young walleye to the lake. Stocking caused unusually fast growth rates, particularly for juvenile walleye, and may have altered cormorant diet in terms of species type and or size composition during stocked years. Ultimately, the high number of walleye caused perch populations to decline, making them less available to cormorants. Despite this, yellow perch were the most common species observed in cormorant diets on Leech Lake. In addition to complications from concurrent fishery management actions, unusually low walleye survival during the mid-2000s when cormorant abundance was increasing resulted in exceptionally fast growth rates of juvenile walleye. When compared to historical length-at-age records, the walleye year classes evaluated in the 2005 and 2008 diet studies may have prematurely outgrown the size range susceptible to cormorant predation, which necessitates additional research. Currently, walleye stocking has been discontinued and juvenile walleye growth rates have returned to more historical levels. The proposed study will evaluate cormorant impacts on the Leech Lake fish population under more "normal" conditions (i.e., a population that is neither stocked nor exhibiting abnormally high growth rates) with an emphasis on obtaining data to predict the range of cormorant effects on juvenile walleye survival (Band 2017).

A second reason to continue diet studies under more "normal" conditions is that zebra mussel veligers (the final larval stage of zebra mussels) were recently discovered in Leech Lake this past summer (2016). It is anticipated that within the next half dozen years this species will establish itself throughout the lake, altering the food web and availability of food for small fish. Data on impacts of non-native species (zebra mussels) on inland lake aquatic communities are limited. The MNDNR is initiating a study to investigate impacts of zebra mussels on fish and invertebrates on Minnesota's large walleye lakes, including Leech Lake, using an isotope-based

food web approach. Analysis of isotopes in animal tissues makes it possible to evaluate the trophic level an animal is feeding in relative to its ecosystem. Leech Lake research is a high priority because zebra mussels are not yet established; meaning the opportunity to collect pre-establishment information still exists. The Band is proposing to work collaboratively the MNDNR to augment the fishery data with data from cormorant tissue samples. Analysis of existing and proposed diet studies will provide a tool for evaluating the role of cormorants as a top predator in freshwater systems and will aid in determining the role of cormorants as lake ecology is modified.

The proposed study at Leech Lake will provide critical time-sensitive data needed for the long-term management of the lake, as well as insights on trophic interactions that can be applied to other systems throughout the Glacial Lakes Region.

1.3 IDENTIFICATION OF ISSUES

The following issues have identified as areas of concern requiring consideration in this EA:

(1) Impact on Leech Lake cormorant populations in reference to MN cormorant populations;
(2) Impacts, both positive and negative, on other wildlife species and their habitats including state, federal, and tribally listed threatened and endangered species, species of conservation concern, and invasive species;
(3) Impacts on aesthetic values; and
(4) Humaneness and animal welfare concerns of methods used

1.4 RELATIONSHIP TO STATUTES, REGULATIONS, OR OTHER PLANS

The proposal complies with the following federal statutes, regulations, Executive Orders, and USFWS Policy:

National Environmental Policy Act (NEPA) (42 USC 4321–4347)
Agencies must complete environmental analyses pursuant to NEPA before implementing federal actions. NEPA requires careful evaluation of the need for action and review of all reasonable alternatives that meet the need for action, including the No Action alternative. NEPA also requires the action agency to consider the potential impacts on the human environment of each alternative. The decision maker(s) must consider the alternatives and

impacts prior to implementation, and must inform the public of these deliberations. The USFWS has prepared this EA in compliance with NEPA; CEQ Regulations, (40 C.F.R. § 1500–1508); DOI NEPA regulations (43 C.F.R. Part 46) and the NEPA-compliance requirements in the Department of the Interior's Departmental Manual (DM) and the USFWS's Manual (FW) (516 DM 8, 550 FW 1–3, 505 FW 1–5).

Pursuant to NEPA and CEQ regulations, this EA documents the analysis of a proposed federal action and reasonable alternatives, including the No Action alternative. The EA considers the direct, indirect, and cumulative effects of the proposed action, alternatives, and potential measures for reducing risk of adverse impacts.

Migratory Bird Treaty Act, as amended (MBTA) (16 USC 703–712)
The MBTA implements the United States' commitment to four international treaties (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the treaties protects most species of birds that are common to both countries. Under the MBTA, it is illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird unless authorized under regulations or by a permit. Bald and Golden Eagles are protected under the MBTA and under the Bald and Golden Eagle Protection Act.

Bald and Golden Eagle Protection Act (Eagle Act) (16 USC 668–668d)
The Bald and Golden Eagle Protection Act prohibits "take" of bald and golden eagles except as authorized under the act and in regulations established by the Secretary of the Interior (16 USC 668a; 50 C.F.R. § 22.22; 50 C.F.R. 22.23; 50 C.F.R. § 22.24; 50 C.F.R. § 22.25). Under the Act, the definition of "*take*" includes actions that "*pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb*" eagles. Under 50 CFR 22.3, the term "disturb", as it relates to take under the Bald and Golden Eagle Act, has been defined as "to agitate or bother a Bald and Golden Eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Endangered Species Act of 1973, as amended (ESA) (16 USC 1531–1544)
It is federal policy under the ESA that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA (§ 2(c)). Federal action agencies must consult with the USFWS under Section 7 of the ESA

to ensure that "any action authorized, funded, or carried out by such an agency… is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species. Each agency shall use the best scientific and commercial data available" (§ 7(a)(2)).

National Historic Preservation Act of 1966, as amended (NHPA) (54 U.S.C 300101 et seq.)
Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. Federal agencies accomplish this by following the Section 106 regulations, "Protection of Historic Properties" (36 C.F.R. Part 800). The Section 106 regulations set forth a process by which agencies: (1) evaluate the effects of any federal undertaking on historic properties (properties included in, or eligible for inclusion in, the National Register of Historic Places (National Register)); (2) consult with State Historic Preservation Officers (SHPO), Tribal Historic Preservation Officers (THPOs), and other appropriate consulting parties regarding the identification and evaluation of historic properties, assessment of effects on historic properties, and the resolution of adverse effects; and (3) consult with appropriate American Indian tribes (tribes) and Native Hawaiian Organizations (NHOs) to determine whether they have concerns about historic properties of religious and cultural significance in areas of these federal undertakings.

For the purposes of MBTA permits, the federal undertaking is the issuance of the permit authorizing take and the associated conservation measures required in order to maintain compliance with the permit, specifically the avoidance, minimization, and mitigation measures. The Area of Potential Effect (APE), as defined in 36 C.F.R. 800.16(d), should include the areas where the USFWS has authorized take and influenced the project through negotiation of the avoidance, minimization, and mitigation measures, as well as the activities associated with their implementation. The activities being proposed will take place on tribally-owned lands, for which the Band has exercised its authority to ensure compliance with NHPA. Furthermore, the proposed activities would not cause major ground disturbance, would not cause any physical destruction or damage to property, wildlife habitat, or landscapes, and would not involve the sale, lease, or transfer of ownership of any property. In general, the proposed methods also would not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties.

Executive Order 13175, Consultation and Coordination with Tribal Governments (65 FR 67249, Nov. 9, 2000)
This EO emphasizes the need for regular and meaningful consultation and collaboration with

tribal officials in the development of federal policies that have tribal implications, the responsibility to strengthen the U.S. government-to-government relationships with Indian tribes, and the responsibility to reduce the imposition of unfunded mandates upon Indian tribes. Each USFWS Regional Director, in coordination with the USFWS Regional Native American Liaison, conducts government-to-government consultation with the tribes in their region. Coordination with tribes other than the Band yielded no concerns regarding the need to consult on this proposal.

Department of Interior Secretarial Order 3317, Policy on Consultation with Indian Tribes (Dec. 1, 2011)

The purpose of this Order is to update, expand, and clarify the Department's policy on consultation with American Indian and Alaska Native tribes; and to acknowledge that the provisions for conducting consultation in compliance with EO 13175, Consultation and Coordination with Indian Tribal Governments, and applicable statutes or administrative actions are expressed in the Department of the Interior Policy on Consultation with Indian tribes. Coordination with tribes other than the Band yielded no concerns regarding the need to consult on this proposal

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (66 FR 3853, Jan. 17, 2001)

This EO specifies the need to avoid or minimize adverse impacts on migratory bird resources when conducting agency actions, as well as the need to restore and enhance the habitat of migratory birds. The proposed action, through its standards for incorporation of avoidance and minimization measures regarding non-target avian species and provisions to reduce degradation of their habitat, and its efforts to understand ecosystem dynamics and to proactively meet the challenge of zebra mussel invasion, is consistent with the goals of this EO.

1.5 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The scope of the analysis within this EA includes cormorants that occur at breeding colonies on Gull and Pelican Islands within Leech Lake Minnesota, and other resources that may be affected, adversely or beneficially, by the scientific research being proposed. The scope of this action includes analysis of a single short-term project to take up to 700 cormorants during the 2017 breeding season for a research study that will analyze cormorant diet, the relationship between cormorant and fish populations in the lake, and interactions among lake trophic levels.

1.6 DECISIONS TO BE MADE

The USFWS, the agency with primary regulatory responsibility for cormorants as established in the MBTA, is the lead agency for this analysis, and will be making the decision regarding whether to authorize the requested permit. The Minnesota Department of Natural Resources provides for the control, management, restoration, conservation, and regulation of birds, fish, game, forestry, and all wildlife resources of the State of Minnesota. The Leech Lake Band of Ojibwe, by way of aboriginal rights, has the authority to manage natural resources on lands and waters within its jurisdiction and to regulate the utilization of these resources by its members. The Band also retains the right to hunt, fish, and gather on lands and waters within its boundaries and ceded territories. APHIS/Wildlife Services (hereafter WS) would work as an authorized agent under a scientific collecting permit issued to the Band with funding for the project primarily coming from the MNDNR. The following questions will be address in the EA:

(1) Can a "Finding of No Significant Impact" be reached or will the proposal have significant effects that cannot be mitigated, requiring an Environmental Impact Statement.
(2) If a SCP can be authorized, what conditions will be required?

CHAPTER 2: ALTERNATIVES

2.0 ALTERNATIVES ANALYZED IN DETAIL

This chapter contains a description of each of the alternatives and a discussion of management strategies and methodologies to be employed.

Alternatives analyzed in detail are:

- Alternative 1 – Issue a Scientific Collection Permit (Proposed Action)
- Alternative 2 – Only Nonlethal Management (No Action)

2.1 DESCRIPTION OF THE ALTERNATIVES

2.1.1. ALTERNATIVE 1: ISSUE A SCIENTIFIC COLLECTION PERMIT (PROPOSED ACTION)

Under this alternative, the USFWS would authorize a SCP (50 C.F.R. § 21.23) for take of cormorants by the Band using the following scientific study design.

Objectives of diet study

(1) Quantify cormorant predation on non-stocked walleye year classes (2015-present); all previously evaluated year classes were stocked with walleye fry
(2) Assess the effect(s) walleye fry stocking and above-average juvenile walleye growth may have had on previous cormorant consumption estimates reported by Schultz et al. (2013)
(3) In combination with previous diet work, establish a baseline understanding of cormorant influence on fish populations prior to zebra mussel establishment
(4) Refine the current management target of 500 nesting pairs (USDA 2005) as appropriate using empirical evidence.

For the diet study, the Band would like to take approximately 30 adult cormorants per week starting as soon as the birds arrive in the spring until they begin to migrate south in the fall (mid-April to August). Studies show that diets were highly variable among seasons and years (Schultz et al. 2013; Band 2017), and in years when cisco and lake whitefish (Coregonus spp.) were significant diet items (2006, 2010) cormorant predation on them was highest during mid-

summer. This is important because daily fish consumption rates (kg/bird/day) by cormorants were lower when Coregonus spp. were significant diet items, meaning predation on other species is buffered (Band 2017). Birds are collected by pass shooting using shotguns as they return from foraging flights; birds are shot at distances away from the nesting colony that does not disturb co-nesting species. As diet study birds are collected, the upper digestive tract is preserved with formalin, the birds are tagged for identification, and returned to Animal and Plant Health Inspection Service, Wildlife Services (hereafter, APHIS/WS) facilities where they are frozen. The birds are given to Reservation Technicians and taken back to the lab where data on sex and age is collected and the fish samples removed from the birds.

Objectives for monitoring fish population under a fixed cormorant population

(1) Evaluate the survival of natural walleye year classes under the current cormorant management target of 500 nesting pairs.

Overall nest and cormorant numbers will be determined by aerial flights and ground counts as needed. Based on counts, cormorants are removed to get down to a population of 500 reproducing pairs. Cormorant removal has ranged from as few as 478 to as many as 1,698 to achieve target levels. When combined with non-lethal control we anticipate that up to 700 adults will need to be taken (this total includes birds taken for diet study plus additional take to stabilize colony size at target levels). These birds would be taken as quickly in the spring as possible before the cormorant eggs start to hatch and will be halted once the target of 500 reproducing pairs is reached. Any harassment (pyrotechnics) will also be completed before it negatively affects co-nesting species. All collections will occur on tribal lands or waters on the Gull and Pelican Island complex in Leech Lake.

For both studies, birds are collected by pass shooting with shotguns at distances away from the nesting colony that does not disturb co-nesting species. Carcasses are disposed of at a licensed landfill or composted in accordance with state guidance for the safe use of composting to dispose of livestock carcasses. APHIS/WS would continue to work as an authorized agent under a scientific collecting permit issued to the Band with funding for the project primarily coming from the MNDNR.
The activities would commence upon approval of a permit, and would continue until August 30, 2017.

2.2.1 ALTERNATIVE 2: ONLY NONLETHAL MANAGEMENT (NO ACTION)

Under this alternative, the USFWS would not issue a SCP to the Band authorizing take of cormorants for their ongoing research. The Band would be able to use nonlethal methods to control the cormorant population on Gull and Pelican Islands to achieve the objectives for monitoring fish populations under a fixed cormorant population, but would not be able to meet the objectives of the diet study that requires lethal take of cormorants.

2.2.2 Use Habitat Management as a Nonlethal Method to Help Meet the Objective for Monitoring Fish Population Responses to a Fixed Cormorant Population

The Band has cleared vegetation from Gull and Little Pelican Islands in an effort to make the sites less attractive to cormorants. Each year, the cormorants bring new nesting material to the island and each fall the Band gathers and destroys the new material. This action is part of an integrated effort to reduce the nesting cormorant population on the lake, but is not sufficient in and of itself to reduce the cormorant population to target levels.

CHAPTER 3 - ENVIRONMENTAL CONSEQUENCES

3.0 INTRODUCTION

Chapter 3 provides information needed for making informed decisions when selecting among the alternatives for meeting the purpose and need of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 1. The proposed action alternative (Alternative 1) is analyzed in comparison with the no action alternative (Alternative 2) to determine if the real or potential effects would be greater, lesser, or the same.

3.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

3.1.1 POTENTIAL IMPACTS ON THE DOUBLE-CRESTED CORMORANT POPULATION

Alternative 1 – Issue a Scientific Collection Permit (Proposed Action)

Annual CDM activities have taken place at Leech Lake since 2005 (USDA 2005). The cormorant population at Leech Lake has declined approximately 80% since 2004 in accordance with management objectives for the site (USDA 2005; Hamilton and Cuthbert 2016). The current cormorant population has been maintained at approximately 2,000 birds with 500 breeding pairs (USDA 2005, 2017; Band 2017). The cormorant population at the state level was estimated at 16,002 nesting pairs at a total of 38 sites in 2004. During subsequent surveys conducted after damage management actions were implemented at Leech Lake, state-wide there were 15,425 nesting pairs at a total of 42 sites in 2010 and 15,421 nesting pairs at 36 sites in 2015 (Hamilton and Cuthbert 2016). Average annual take of cormorants under the PRDO at Leech Lake for the period of 2005-2010 was 2,876 cormorants per year (range 2,522-3303 cormorants per year) with an additional annual average of 2,178 cormorants taken by WS and other entities for other projects (USDA 2005, 2006, 2007, 2008, 2011a, 2011b). During the period of relative cormorant population stability in the state (2011-2016), the annual number of cormorants lethally taken at Leech Lake averaged 1,356 birds per year (range 442 birds to 1,848 birds per year) with an additional annual average of 2,705 cormorants taken by WS and other entities for other projects. These data indicate that the cormorant population in the state initially declined slightly in response to CDM actions at Leech Lake and elsewhere throughout the state, but has subsequently stabilized. Minnesota continues to have a sizable and widely diverse cormorant population.

The proposed action would result in a maximum take of 700 cormorants in 2017, a 48% decrease of the average annual take under the PRDO, and an 83% decrease of the total average annual statewide take under all activities that occurred from 2011 – 2016. As noted above, population survey data for the state for 2011-2016 indicate that the Minnesota cormorant population remained relatively stable during this period despite average annual removals of approximately 4,000 birds per year. Given current restrictions on the USFWS to issue depredation permits for the take of cormorants (USFWS 2017), take by other entities in 2017 will be dramatically decreased from what was typical for the period of 2011-2016. The only authorized take of cormorants in the state of Minnesota in 2017 is cormorant eggs for a contaminants study under a different SCP. The proposed action would place greater emphasis on use of nonlethal methods to help maintain the Leech Lake cormorant population at the management objective of 500 breeding pairs. Consequently, the proposed action would not result in substantive changes in the number of cormorants at Leech Lake, but would likely result in the dispersal of cormorants to other locations in Minnesota, neighboring states or Canada. The statewide cormorant population is expected to remain stable or may increase slightly if birds dispersed from Leech Lake remain in Minnesota instead of dispersing to other locations in the United States or Canada.

An intensive survey of breeding cormorants in the Great Lakes region in 2005 (excluding Leech Lake), indicated that the number of nests (112,600) had increased 26.7% from the last complete Great Lakes-wide cormorant census in 1997 (88,902 nests; Weseloh et al. 2006). Subsequent surveys conducted from 2005 – 2014 in the U.S. Great Lakes (including Canada), indicate nest abundance declined by 37% to under 70,000 nests. In the U.S. portion of the Great Lakes, nest abundance declined by 31% from 53,802 breeding pairs to 37,225 breeding pairs during the same period (Wyman et al. 2016). Given the lack of recent decrease in the Minnesota cormorant populations, and that there has been no CDM conducted on the Minnesota portions of Lake Superior, CDM activities in Minnesota are not contributing substantively to the decrease in the Great Lakes Area cormorant population. Additionally, information gained from the scientific studies under the proposed action may provide insight to not only Leech Lake, but also other similar lake systems throughout the cormorants breeding range.

Alternative 2 – Only Nonlethal Management (No Action)

Under the No Action Alternative, the USFWS would not issue a SCP. CDM activities at Leech Lake would not result in a reduction in the state cormorant population because lethal techniques would not be used and cormorants would only be hazed and harassed in an attempt to move them to other areas to meet the objective of monitoring fish populations under a stable cormorant population. Exclusive use of nonlethal methods is not expected to be as effective as use of lethal methods, particularly because use of nonlethal methods will have to be scaled back when non-target birds are present to minimize risk of adverse impacts on non-target birds. Consequently, the number of breeding pairs at Leech Lake is expected to be higher under this alternative than under Alternative 1. The overall impact of this alternative on the cormorant population would be minimal and would not jeopardize the long-term sustainability of cormorant populations at a local, state, regional, or national level. However, the objectives of the diet study would not be met and there may be an opportunity cost under this alternative in that essential scientific information necessary to improve lake management in the future will not be obtained.

3.1.2 POTENTIAL IMPACTS ON NON-TARGET SPECIES

Alternative 1 – Issue a Scientific Collection Permit (Proposed Action)

Bird species nesting on Gull, Big and Little Pelican Islands at Leech Lake are the non-target species most likely to be impacted by the proposed action. These species include Ring-billed Gulls, Herring Gulls, American White Pelicans, Caspian and Common Terns and Bald Eagles. In some years, Piping Plovers have been sighted resting and foraging on shorelines of Big and Little Pelican Island during migration. All species are protected under the Migratory Bird Treaty Act. Piping Plovers are state, federal, and tribally-listed Endangered Species. Common Terns are listed by the state and the Band as a Threatened Species. Bald Eagles are listed by the Band as Threatened and have additional protections under the Bald and Golden Eagle Protection Act. American White Pelicans are listed by the Band as a Sensitive Species, and by the state as a Species of Concern. Forster's Terns are also listed by the Band as a Sensitive Species. WS has ongoing consultations with the state and Band-DNR and implements all provisions established by these agencies for the protection of state and tribally-listed species.

WS implements many standard operating procedures to minimize disturbance of other wildlife species that may occur with or near cormorant, including Common Terns, Caspian Terns,

American White Pelicans, and Ring-billed Gulls. CDM actions do pose a slight risk of unintentional indirect loss of Ring-billed Gull and American White Pelican eggs and young because of the human disturbance associated with cormorant culling activities at the Little Pelican Island nest site on Leech Lake. This kind of take is most likely to occur early in the season when the weather is still cool and birds may leave nests due to the proximity of human activity. Ring-billed Gulls are known predators of eggs and chicks of other bird species, including other Ring-billed Gulls. Human activity on the island may result in adults leaving the nest and brief periods when eggs and chicks are at increased risk of gull predation. To address these issues, WS-Minnesota avoids accessing the island after non-target species arrive. WS also avoids accessing the island during periods of atypical cold or rain to avoid disturbing adults when eggs and chicks are in most need of thermal protection. WS-Minnesota would shoot cormorants that are passing to or from the island to avoid disturbing nesting birds on the island and eliminate the need to go to the island to retrieve carcasses. WS-Minnesota personnel also verify the identity of target species prior to shooting which virtually eliminates the risk of shooting non-target species. Again, WS-Minnesota is an authorized agent under a scientific collecting permit issued to the Band.

Gulls. The only direct take of non-target species that occurred during the 2011-2016 statewide CDM activities was the accidental shooting of a Ring-billed Gull during 2016 (incident did not occur at Leech Lake). Ring-billed Gulls are common, appear to readily adapt to human-altered landscapes, and is not considered an at risk species (Wires et al. 2010). Data on Ring-billed Gull Nests is provided in Figure 1, but only general estimates of Ring-billed Gull nests are available for 2013, 2015 and 2016. Although the number of Ring-billed Gull nests on the island has shown considerable annual variation, there appears to be a generally stable to increasing trend (Fig. 1). CDM activities do not appear to be adversely impacting the Ring-billed Gull population.

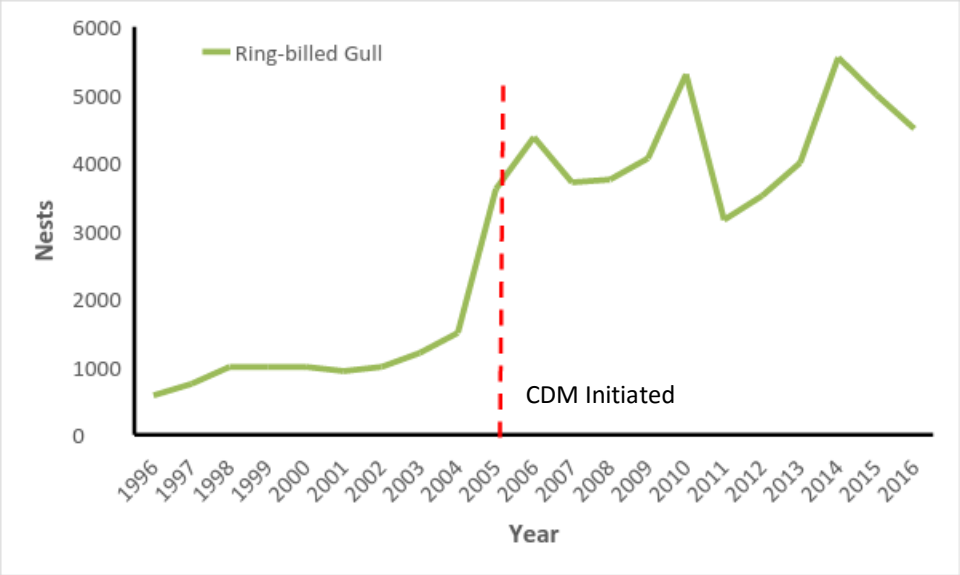

Figure 1. Ring-billed gull nests on Gull and Pelican Islands in Leech Lake, Minnesota. Numbers for 2013, 2015 and 2016 are estimates (S. Mortensen, BAND, unpub. data).

Limited numbers of Herring Gulls have nested in most years since the initiation of CDM at Leech Lake with no evidence of a strong population trend (Fig. 2). In general, CDM activities do not appear to be adversely impacting Herring Gulls.

American White Pelicans. American White Pelicans have successfully nested at Leech Lake since 2008, after the initiation of the CDM program on Leech Lake in 2005 (Fig. 2). The successful fledging of young in 2008-2015 indicates that the CDM program has not prevented pelicans from successfully nesting at Leech Lake. Successful pelican nesting has been increasingly consistent since 2005 when CDM was initiated (S. Mortensen, BAND, unpub. data).

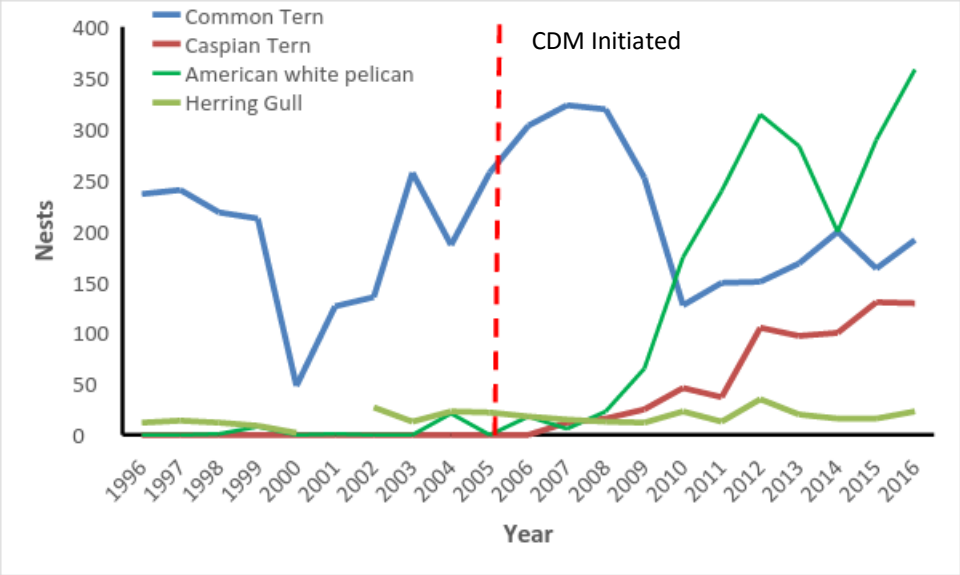

Figure 2. Common Tern, Caspian Tern, American White Pelican, and Herring Gull nests on Gull and Pelican Islands in Leech Lake, Minnesota (S. Mortensen, BAND, unpub. data).

Terns. The CDM program at Leech Lake was initiated in response to concerns about cormorant impacts on the walleye, pike, and yellow perch fishery and on the state and tribally-listed threatened Common Tern (USDA 2005). The increasing number of nesting cormorants at Little Pelican Island caused Ring-billed Gulls to shift their use of nesting space on the island and increased the number of Ring-billed Gulls attempting to use sites prepared for Common Terns. Cormorant population reduction decreased the area occupied by cormorant nests on Little Pelican Island. Nonetheless, since 2008, the Common Tern reproductive success on Little Pelican Island decreased to 127 nests in 2010 and has remained stable or increased only slightly since that time (Fig. 2). Common Tern nests on the island initially increased during the early years of the program when CDM activities where greatest (2005-2007; average 3,017 cormorants taken per year), so it does not seem likely the decline is directly related to CDM efforts. It is speculated that the continued decrease of reproductive success may be from the combined effect of larger colonial birds competing for premium nesting sites and other disturbances on the islands (S. Mortensen, BAND, pers. com. 2011). A new nest site was built for terns in the fall of 2005, near the central portion of the island in an area that had previously been occupied by cormorant nests. However, some terns continue to use sites on the north and south ends of the island. Terns nesting at the ends of the island generally experience low nesting success, which contributed to the low overall nest success for the island.

The 2007 nesting of Caspian Terns on Little Pelican Island on Leech Lake was the first documented successful nesting of the species in Minnesota. In 2010, Caspian Terns established 46 nests and fledged 70 chicks (Mortensen 2010). In 2016, Caspian Terns fledged approximately 167 chicks (S. Mortensen, BAND, unpub. data). As nesting numbers have been increasing since 2007, cormorant control does not appear to be having a negative effect on this species.

Bald Eagles. There is an active Bald Eagle nest located on the Northwest shore of Big Pelican Island that was protected from disturbance by a 750 ft. buffer zone. The closest any cormorant culling occurred to the nest was about 0.4 miles and no disturbance was noted. These provisions were outlined in the Minnesota State EA (2005). Eagles have fledged from this nest since the initiation of CDM activities.

Piping Plovers. In some years, Piping Plovers have been sighted resting and foraging on sandy shorelines of the Big and Little Pelican Island complex during migration. All staff conducting CDM are trained in the identification of Piping Plovers. In accordance with the provisions of Section 7 consultation conducted in association with the development of the AQDO and PRDO (USFWS 2003), in the event any Piping Plovers were observed, WS-Minnesota maintains a buffer zone of at least 1,000 feet between the plovers and humans.

Other federally-listed threatened or endangered species. Other than the Piping Plovers noted above, no other federally-listed threatened or endangered species occur in the project area.

Population data prior to the implementation of CDM activities under the PRDO (1998-2004), showed that the cormorant colony at the Pelican Island complex had grown dramatically. Without management that occurred under the Depredation Orders, the cormorant population is expected to follow a similar population trajectory. An increase in the cormorant population may potentially displace other colonial species such as gulls, Common Terns, and Caspian Terns through habitat degradation and nest site competition. Although the goal of the research activity is not to control cormorants on Leech Lake, an additional benefit of lethal and nonlethal CDM activities would be minimizing the impact of cormorants on co-nesting species.

Alternative 2 – Only Nonlethal Management (No Action)

Under the No Action Alternative, the Band would be restricted to the use of nonlethal techniques.

Adverse Impacts on Non-target Species including Threatened and Endangered Species

The primary risk to non-target species from the use of nonlethal techniques is the risk of disturbance of co-nesting species from harassment and nest destruction. Without even the minor use of lethal techniques to reinforce hazing and frightening devices and reduce habituation (cormorants getting used to and not responding to frightening devices), more hours of nonlethal CDM (e.g., use of frightening devices, nest destruction) would be needed than the proposed action in order to achieve similar management objectives. However, the Band and WS will continue to utilize standard operating procedures for harassment and nest destruction activities as noted for Alternative 1 in order to reduce disturbance of listed (Federal, State, Tribal) and unlisted non-target species. Consequently, the extent to which use of these methods can be increased is limited. Given the limits on the use of this method and the tendency of cormorants to habituate to frightening devices, it is probably not possible to achieve the management objective of keeping the cormorant population at a stable level. As noted for Alternative 1, without management that occurred under the Depredation Orders, the nesting cormorant population at Leech Lake is expected to increase. An increase in the cormorant population may potentially displace other colonial species such as gulls, Common Terns, and Caspian Terns through nest site competition.

3.1.3 POTENTIAL IMPACTS ON AESTHETIC VALUES

Alternative 1 – Issue a Scientific Collection Permit (Proposed Action)

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and is dependent on what an observer regards as beautiful. Some individuals enjoy coming into contact with or viewing wildlife such as cormorants, while others may see the same species as a detriment to aesthetic values (e.g. droppings and odor associated with large groups of cormorants, potential for adverse impacts on fishing opportunities). Therefore, public opinion is variable because there are numerous philosophical and personal attitudes, values, and opinions about the aesthetic value of wildlife and the best ways to reduce conflicts/problems between humans and wildlife.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to natural ecosystems (e.g., ecological, existence, bequest values)

(Bishop 1987).

There is likely to be concern that the proposed action would result in the loss of aesthetic benefits to some public citizens, resource owners, or neighboring residents. Potential impacts of the proposed action on aesthetic values include:

- a reduction in opportunities to view and enjoy cormorants at specific sites where management actions are conducted (i.e. Gull and Pelican Islands);
- a reduction in the opportunity to view and enjoy co-nesting colonial waterbirds that might be adversely impacted by CDM activities (or the lack thereof);
- noise disturbance associated with the use of some nonlethal methods; and
- a temporary reduction in opportunities to enjoy certain fishery resources in buffer zones that are closed to public access when pyrotechnics and shooting may be occurring .

The proposed action is intended to continue the environmental status quo of maintaining the Leech Lake cormorant population at 500 breeding pairs. Consequently, this will be no change from conditions at the site for the last 6-7 years. Overall cormorant numbers will be lower than had occurred in 2004 before work under the PRDO was initiated, but based on observations conducted in previous years, there will still be thousands of cormorants (breeding pairs and fledglings) at the site for people to view and enjoy. As noted above, the proposed action will have low impact on non-target bird species and there may be incidental benefits for some species from the reduction in cormorant numbers. Therefore, the proposed action would have a low level of impact on opportunities to view co-nesting birds.

Closures for CDM activities are limited to a 1/4 mile buffer around the islands and are only in effect from the arrival of cormorants in early spring until approximately mid-June. Noise from the use of frightening devices would occur over a shorter duration because it is typically discontinued when co-nesting bird species start using the islands. The fishing community and most of the residents and businesses around the lake, including Band members, have been generally supportive of previous work that occurred under the PRDO and are likely to see ongoing research as a benefit to the long-term health of Leech Lake sport fish populations. Individuals opposed to use of lethal methods may consider noise impacts from frightening devices acceptable because use of nonlethal methods reduces the need for lethal methods. Given the limited area and short-term nature of the project and that it is supported by the majority of the residents and fishing community, impacts of the proposed action on aesthetic values would be low.

Alternative 2 – Only Nonlethal Management (No Action)

Under the No Action Alternative, the USFWS would not be issuing a SCP. People opposed to any government involvement in cormorant activities would favor this alternative, as would those concerned about the welfare of individual birds and the use of lethal management activities. However, the Band would still be allowed to use non-lethal techniques to try to manage the nesting colonies to achieve some of its study objectives (work to maintain the number of breeding cormorant pairs at 500 pairs) and some individuals might oppose dispersal or translocation of birds. There may be a slight increase in disturbance associated with the increase in use of frightening devices. However, noise impact are anticipated to be only slightly greater than the combined impact of shooting and nonlethal methods in Alternative 1 because use of frightening devices would be curtailed when non-target birds start nesting on the islands.

Beneficial impacts of this alternative on the opportunity to enjoy birds or fisheries resources that are negatively impacted by cormorants will be lower than the proposed action alternative because this alternative is not anticipated to be as effective in achieving cormorant population management objectives. Additionally, the potential loss of scientific information that may lead to future improvements to the management of Leech Lake could also lower future opportunities to enjoy fisheries resources. Lack of information that would lead to refinement of cormorant management objectives on the lake could have adverse long-term impacts for individuals concerned about welfare of individual cormorants and use of lethal methods if the improved data indicates more cormorants could be sustained on the lake without adversely impacting fishing opportunities.

3.1.4 POTENTIAL IMPACTS ON HUMANENESS AND ANIMAL WELFARE CONCERNS OF METHODS USED

Alternative 1 – Issue a Scientific Collection Permit (Proposed Action)

Cormorant control methods, especially lethal control, may raise issues about humaneness and animal welfare. The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept. Humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

Some individuals would be opposed to the use of lethal methods, especially if the research is intended to inform and manage another natural resource that some perceive as a non-essential purpose (e.g., sport fishing). Other individuals may be concerned that the methods used to minimize pain and suffering of target animals is insufficient. In general, methods that result in a quick death and pose little or no risk to non-target species, such as shooting by trained professionals as proposed in the permit request, are considered more humane than other techniques. Alternatively, some individuals may see the research project as less objectionable than lethal removal of cormorants for other reasons, because the information obtained may reduce the need for future use of lethal management at Leech Lake.

Alternative 2 – Only Nonlethal Management (No Action)

Under the No Action Alternative, lethal methods viewed as inhumane by some persons would not be used at Leech Lake because a SCP would not be issued. Individuals who consider the use of lethal methods inhumane would find this alternative preferable to Alternative 1. However, others may see this alternative as less humane because it would impede progress in understanding cormorant impacts on the fishery and refinement of cormorant management practices.

3.2 CUMULATIVE IMPACTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time. The potential cumulative impacts analyzed below could occur because of the research activities over time or because of the aggregate effects of those activities combined with the activities of other agencies and individuals.

3.2.1 Cumulative Impacts on Wildlife Populations

As analyzed in Sections 3.1.1 and 3.1.2, CDM methods used or recommended by the lead agency together with impacts by other entities, will likely have no cumulative adverse effects on cormorant and non-target wildlife populations. Take of cormorants by all sources in

Minnesota in 2017 will be considerably less than what has been considered sustainable in the recent past because of restrictions on issuing depredation permits. The proposed action will not affect the long-term sustainability of cormorant populations in Minnesota, the region, or the U.S.

When control actions are implemented, the potential lethal take of non-target wildlife species is expected to be minimal to non-existent. In addition to achieving the objectives of the two research studies, there is also potential for incidental beneficial impacts on sensitive wildlife populations, and populations of free-swimming fish under Alternative 1 and reduced benefit under Alternative 2.

3.2.2 Cumulative Impact on Aesthetic and Humaneness Concerns

Due to the vacatur of the depredation orders, use of lethal methods for cormorant damage management will be substantially reduced state, region, and nation-wide. For individuals whose aesthetic enjoyment of nature is adversely impacted by the knowledge that lethal methods are in use, the proposed action will have less potential for adverse impacts than prior to the loss of the depredation orders. Although the proposed take would comprise only a small portion of previous take nationwide, overall, this type of adverse impact would be lower under Alternative 2 (no SCP) than under Alternative 1. State, regional, and national opportunities to view and enjoy cormorants would be higher because of the reduced cormorant take at these various spatial scales under Alternative 2. Impacts at Leech Lake are likely to be similar to conditions under the depredation orders under Alternative 1, and slightly higher under Alternative 2. For similar reasons, overall perceptions of the humaneness of cormorant management without the depredation orders would be seen as more humane than when the orders were in place; and Alternative 2, which does not authorize any lethal take of cormorants, would be considered the most humane overall.

At the state, national and regional level, cormorant take for the protection of co-nesting species, fishery resources, and vegetation would be reduced as would aesthetic opportunities to enjoy resources that are adversely affected by high concentrations of cormorants. As documented above, neither Alternative 1 nor 2 would have substantive adverse impacts on co-nesting species and only incidental benefits.

3.3 SUMMARY

Under the Proposed Action, the lethal removal of cormorants to achieve study objectives would not have an adverse impact on overall cormorant populations in Minnesota, but local reduction may occur. No risk to public safety is expected when CDM activities are conducted under Alternatives 1 or 2 because trained and experienced wildlife biologists/specialists would be conducting the work and providing guidance (technical assistance) to others conducting nonlethal CDM.

Although some people will likely be opposed to the Band taking cormorants for scientific purposes on public and tribal lands within the state of Minnesota, the analysis in this EA indicates that the proposed level of take will not result in cumulative adverse impacts on the quality of the human environment. Table 1 summarizes the expected impact of each of the alternatives on each of the issues.

Table 1. Summary of Impacts of each of the Alternatives on each of the issues identified for analysis.

Issues	Alternative 1 Issue a Scientific Collection Permit (Proposed Action)	Alternative 2 Only Nonlethal CDM (No Action)
Effects on DCCO Populations	Low effect - some reduction in local DCCO numbers; would not significantly affect state, regional, national, and continental populations.	Lower effect than Alternative 1 as nonlethal methods are used to discourage some birds from nesting. Low to No effect on state population depending on where the birds from Leech Lake go. No effect on regional or national population.
Effects on Lake Management	Potential benefit to management of natural resources on Leech Lake (including cormorant) and other similar systems as the result of scientific information gained.	Low benefit to the management of Leech Lake and similar systems because diet study would not be conducted. May achieve a subset of fish monitoring study objectives.
Effects on Other Wildlife Species, Including T&E Species	Low effect - methods used by lead agency would be highly selective with very little risk to non-target species. Specific measures to minimize impacts to T&E species.	Low effect - methods used by lead agency would be highly selective with very little risk to non-target species. Specific measures to minimize impacts to T&E species.

	Potential localized benefits to some species (birds, fish) adversely impacted by DCCOs	Benefits to some species (birds, fish) adversely impacted by DCCOs dependent upon efficacy of exclusive use of nonlethal techniques.
Aesthetic Impacts	Low to moderate effect at local levels; a portion of the local population will be reduced. Some noise disturbance and localized areas temporarily closed to public for safety. Cormorant CDM activities do not adversely affect overall state, regional and continental cormorant populations. Some adverse impacts on individuals disturbed by the use of lethal methods. Best potential for localized benefits to those who enjoy birds, plants and fish that may be adversely impacted by cormorants.	Low to moderate effect. Some noise disturbance and localized areas temporarily closed to public for safety. Noise impact shift from shooting and pyrotechnics (Alternative 1) to slightly increased use of pyrotechnics. Impact will depend on success of efforts to relocate cormorants with nonlethal techniques to meet the objectives of the fish monitoring study. Localized benefits will be variable to those who enjoy birds and fish that may be adversely impacted by cormorants and will depend of efficacy of nonlethal techniques. Some increased benefit to individuals disturbed by use of lethal methods.
Aesthetic Damage caused by Cormorants	Low effect - Some cormorant damage is likely to be reduced without moving the problem elsewhere as an additional benefit of the research.	Low to moderate effect - Lead agency would work to attempt to disperse cormorants to other locations. Due to habituation to nonlethal techniques this is more difficult if lethal CDM cannot be used.
Humaneness and Animal Welfare Concerns of Methods Used	Low effect - Shooting used viewed as inhumane by some people. More cormorants lethally taken than under Alternative 2.	No effect because only nonlethal methods would be used by lead agency.

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